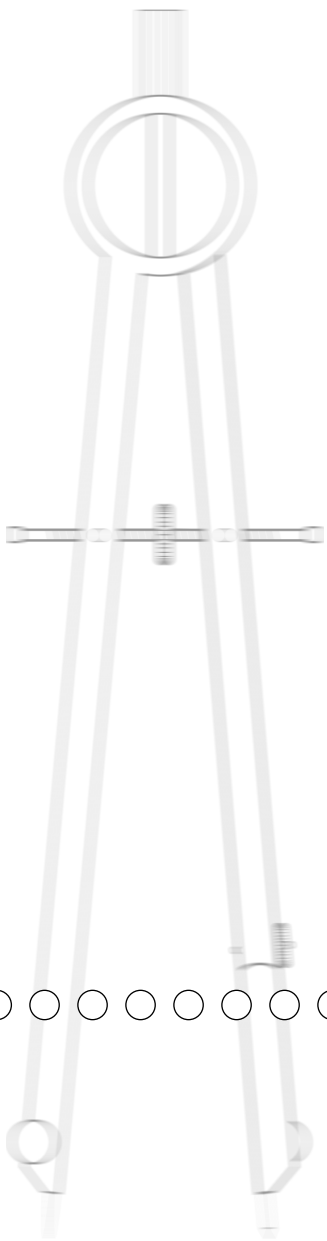




Translation and Cultural Adaptation of the TIMSS Instruments

Kathleen M. O'Connor
Barbara Malak







5

Translation and Cultural Adaptation of the TIMSS Instruments

Kathleen M. O'Connor
Barbara Malak

5.1 Overview

The TIMSS 1999 data-collection instruments (achievement tests and background questionnaires) were prepared in English and translated into 33 languages. Ten of the thirty-eight participating countries collected data in two languages. The most common languages of testing were English (nine countries) and Arabic (four countries).

For the TIMSS 1999 main survey, each country had to translate the following instruments:

- Eight booklets of mathematics and science achievement items (Test Booklets 1-8)
- One Student Questionnaire
- One Mathematics Teacher Questionnaire
- One Science Teacher Questionnaire
- One School Questionnaire

The translation process was designed to ensure standard instruments across countries. National Research Coordinators (NRCs) received guidelines for translating the testing instruments into their national languages and cultural context (TIMSS, 1998a). After the translation was completed, the translated instruments were checked by an international translation company against the TIMSS 1999 international version to assess the faithfulness of translation. The NRC then received feedback from the translation company and the International Study Center suggesting additional revisions. After these had been made, the final version was checked by the International Study Center at Boston College.

5.2 Translation of Instruments

The TIMSS 1999 survey translation guidelines called for two independent translations of each test instrument from English into the target language. A translation review team then compared the two translations to arrive at a final version. Any deviation from the international version of the instrument and all cultural adaptations made were reported on a *Translation Deviation Form* (blank form is provided in Appendix B of this report).

The translation procedure at the National Research Centers included the following steps:

- Identify the test language
- Identify translators for two independent translations
- Translate instruments and adapt as necessary
- Confer and reconcile the two independent translations
- Document all translation deviations and cultural adaptations

5.2.1 Identifying the Test Language

Each NRC identified the language or languages to be used in testing and the geographical or political areas associated with them. Most countries tested in just one language, but 9 tested in two languages (see Exhibit 5.1).

If a single translation was prepared within a country, translators needed to ensure that it was acceptable to all of the dialects of the language in which the assessment was to be administered. Professionals in these dialects were to be involved in adapting the instruments and testing materials. The language of the test in each country is presented in Exhibit 5.1.

Exhibit 5.1 Language of Testing in Each Country

Country	Language(s) of Test	Country	Language(s) of Test
Australia	English	Latvia	Latvian
Belgium (Flemish)	Flemish	Lithuania	Lithuanian
Bulgaria	Bulgarian	Macedonia, Rep. of	Macedonian and Albanian
Canada	English and French	Malaysia	Malay
Chile	Spanish	Moldova	Moldavian and Russian
Chinese Taipei	Chinese	Morocco	Arabic
Cyprus	Greek	Netherlands	Dutch
Czech Republic	Czech	New Zealand	English
England	English	Philippines	English and Filipino
Finland	Finnish and Swedish	Romania	Romanian
Hong Kong, SAR	Chinese and English	Russian Federation	Russian
Hungary	Hungarian	Singapore	English
Indonesia	Indonesian	Slovak Republic	Slovak
Iran, Islamic Rep.	Farsi	Slovenia	Slovenian
Israel	Hebrew and Arabic	South Africa	English and Afrikaans
Italy	Italian and German*	Thailand	Thai
Japan	Japanese	Tunisia	Arabic and French**
Jordan	Arabic	Turkey	Turkish
Korea, Republic of	Korean	United States	English

* Italy did not have the German version of the items and student questionnaire verified. Less than 1% of the population took the assessment and student questionnaire in German.

** Tunisia translated only the Teacher Questionnaires into French.

5.2.2 Identifying Translators for Two Independent Translations

Translators were expected to have an excellent knowledge of both English and the target language, experience with eighth-grade students, and experience in the subject matter and test development.

For the achievement tests, four translators were required for each target language, two each with expertise in mathematics education and in science education. Where subject-matter experts were not available as translators, the translators were expected to work closely with subject-matter experts to ensure that the content and difficulty of the items did not change in translation.

Translators of general text materials (school, teacher, and student questionnaires and manuals) did not need to be subject-matter specialists, so only two translators were necessary for these documents.

5.2.3 Translation and Cultural Adaptation of Instruments

Translators were given guidelines and procedures to follow in translating the data collection instruments and adapting them to their national cultural context. The guidelines were designed to yield translations that were as close as possible to the international (English) versions in style and meaning, while allowing for cultural adaptations where necessary. Translators were cautioned not to change the meaning or the difficulty level of an item.

The translators' tasks included:

- Identifying and minimizing cultural differences
- Finding equivalent words and phrases
- Ensuring that the reading level was the same in the target language as in the international version (English)
- Ensuring that the essential meaning of the text did not change
- Ensuring that the difficulty level of achievement items did not change
- Being aware of possible changes in the instrument layout due to translation

Translators were permitted to adapt the text as necessary to make unfamiliar contextual terms culturally appropriate. Acceptable adaptations included changes in the names of seasons, people, places, animals, plants, currencies, and the like. Exhibit 5.2 shows a list provided to translators detailing the types of adaptations that were acceptable.

Exhibit 5.2 Types of Acceptable Cultural Adaptations

Type of Change	Specific Change from	Specific Change to
Punctuation/Notation	decimal point	decimal comma
	place value comma	space
Units	centimeters	inches
	liters	quarts
	ml	mL
Proper nouns	Ottawa	Oslo
	Mary	Maria
Common nouns	robin	kiwi
	elevator	lift
Spelling	center	centre
Verbs (not related to content)	skiing	sailing
Usage	Bunsen burner	hot plate

Translators were allowed to change terms and expressions that were not common to their national culture. It was important, however, that their changes did not affect the following:

- The meaning of the question
- The reading level of the text
- The difficulty level of the item
- The likelihood of another possible correct answer for the test item

Although item writers and reviewers attempted to write and select items that would readily translate into the language of the participating countries, occasionally an item proved problematic for translators. In those instances, the International Study Center was notified and a corresponding statement included in the NRC survey activities report.

5.2.4 Reviewing Independent Translations for Consensus

The two completed translations were compared item by item, and any differences reconciled. In most cases, by discussing the differences in the translations of a particular item, the translators were able to agree on the version appropriate for the study. A third translation expert was consulted if any disagreement remained.

After a single translation had been agreed upon, the translation deviation form was used to record all deviations in test and questionnaire items. Translators documented all changes in vocabulary and content not authorized in the translation guidelines. The description of each deviation included the English term, the translated term, and an explanation of why that term was selected. Translators also noted any other changes or problems with the translation. This record of deviations was used during translation verification and during the item analysis and review.

5.3 Verification of Instruments

Each country's translated documents went through a rigorous verification process that included statistical verification of the item translations at the national centers, verification by an international translation company, a review by the International Study Center, and a check by quality control monitors.

5.3.1 Verification of Translations at National Centers

The results of item analyses from the field test were reviewed by each country. Since unusual results for an item could indicate errors in translation, each NRC was asked to check the results to identify items that might have been mistranslated. NRCs were notified of any potentially problematic items and asked to check whether the translation was sound.

5.3.2 Submission of Instruments for External Verification

Once the final translated version of each instrument was agreed upon, the translation was checked through an external verification process. NRCs were required to send (no later than 6 weeks before printing) the following material to the IEA Secretariat in preparation for external translation verification:

- One copy of the test item clusters (A through Z) and the accompanying instructions for students
- One set of test booklets (1 through 8)
- One copy of the school questionnaire, student questionnaire, and teacher questionnaires

All 38 countries that participated in the TIMSS 1999 main survey submitted national versions of instruments for translation verification (See Appendix B for a list of instruments submitted).

Three countries deviated in some way from the formal verification process. Italy verified the Italian versions of the instruments but did not verify the German versions, which were administered

to less than 1% of the sample. In the case of South Africa and Singapore, the results of verification were not obtained before test administration. The review and documentation of the translation deviations for both countries took place after the test had been conducted. The verifiers did, however, find that South African and Singaporean cultural adaptations of English, as well as the South African translation into Afrikaans, were of high quality.

5.3.3 International Verification of the Translations

The IEA Secretariat, which organized and managed the translation-verification process, enlisted Berlitz, an international translating company with a reputation for excellence, to check the quality of the translations. Berlitz staff were to document all errors and omissions, and make suggestions for improvements so that National Research Coordinators could review and revise their instruments.

The translators Berlitz chose as translation verifiers for TIMSS 1999 were required to have the target language as their first language, to have formal credentials as translators working in English, and to be living and working in the target country. Verifiers received general information about the study and the design of the instruments. They also received materials describing the translation procedures used by the national centers along with detailed instructions for reviewing the instruments (TIMSS, 1998b). They were asked to recommend improvements in the translation, when necessary, and to alert the national centers to any deviation in the layout of the test instruments. Each verifier received a package consisting of:

- The international version of each survey instrument
- A set of translated instruments to be verified
- A copy of the instructions given to the translators in their country
- Instructions for verifying the layout of the survey instruments
- Instructions for verifying the content of the survey instruments
- Instructions for verifying the instructions to students
- Translation verification control forms to be completed for each document
- Translation verification report forms

The main task of the translation verifiers was to evaluate the accuracy of the translation and the comparability of layout of the survey instruments. The verification guidelines emphasized the importance of maintaining the meaning, difficulty level, and format of each item while allowing for cultural adaptations as necessary.

For TIMSS 1999 countries that also participated in 1995, verifiers were responsible for ensuring that the translated version of the trend items was identical to that administered in 1995. Accordingly, verifiers reviewing instruments for trend countries also received the following:

- A set of trend item clusters A through H (1995 version used in that country)
- A trend item verification form

5.3.4 Translation Verification Reports

The translation verifier prepared two types of reports to document the verification process. First, the verifier completed a translation verification control form for each instrument. Its cover sheet served as a summary and indicated whether or not deviations were found. If the translated version was judged to be equivalent to the international version, no further entry needed to be made in the form. Second, for each translated version of an item that differed in any way from the international version, an entry was made in the translation verification report form giving:

- The location of the deviation (item #)
- The severity of the deviation (using the severity code below)
- A description of the change
- A suggested alternative translation

These records are used to document the quality of the translations and the comparability of the testing materials across countries. The *severity codes* ranged from 1 (serious error) to 4 (acceptable adaptation)¹ as follows:

○○○

1. When in doubt as to the severity of the deviation, verifiers used code 1.

Code 1 - Major Change or Error: Examples include incorrect ordering of choices in a multiple-choice item; omission of a graph; omission of an item; incorrect translation of text such that the answer is indicated by the question; an incorrect translation that changes the meaning or difficulty of the question; incorrect ordering of the items or placement of the graphics.

Code 2 - Minor Change or Error: Examples include spelling errors that do not affect comprehension; misalignment of margins or tabs; incorrect font or font size; discrepancies in the headers or footers of the document.

Code 3 - Suggestions for Alternative: The translation may be adequate, but the verifier suggests a different wording for the item.

Code 4 - Acceptable Changes: The verifier identifies changes that are acceptable and appropriate, for example, a reference to winter that is changed from January to July for the Southern Hemisphere.

The layout of the documents was also reviewed during verification for any changes or deviations. Exhibit 5.3 details the layout issues to be considered and checked for each survey instrument.

Exhibit 5.3: Layout Issues Considered in Verification

Layout Issues	Verification Details
Instructions	Test items should not have been visible when the test booklet was opened to the Instructions
Items	All items should have been included in the same order and location as in the international version
Response options	Response options should have appeared in the same order as in the international version
Graphics	All graphics should have been in the same order and modifications should have been limited to necessary translation of text or labels
Font	Font and font size should have been consistent with the international version
Word emphasis	Word emphasis should have remained the same as in the international version; if the form of emphasis was not appropriate for the given language, an acceptable alternate form should have been used (e.g., italics instead of capital letters)
Shading	Items with shading should have been clear and text legible
Page and item identification	Headers and footers that include booklet and page identification as well as item identification should have been present
Pagination	Page breaks should have corresponded with the international version of the instruments

If the layout of an instrument differed in any way from the original international version, an entry was made in the translation verification report form indicating the location and severity of the deviation and describing the change. If necessary and appropriate, a suggestion for improving the layout was included. In the case of TIMSS 1995 participants, any differences between the 1995 and 1999 versions of test items were entered in the trend item verification form, and the nature of the change was described.

The completed translation verification forms were sent to NRCs and to the International Study Center at Boston College. The NRCs were responsible for reviewing the report forms and revising the instruments based on the translation verifiers' suggestions.

5.3.5 International Study Center Item Review

As a final review, when NRCs had acted upon the suggestions of the verifiers, they submitted a print-ready copy of the achievement test booklets and questionnaires to the International Study Center at Boston College. These were reviewed by the International Study Center primarily to identify issues such as misplaced graphics, improper format, and inconsistent text.

For all countries, items were compared with the international version to identify any changes in text, graphics, and format. For languages in which the reviewers were not fluent, items were reviewed for format and similarity of words used in the stem and options.

For trend countries, each item in Clusters A-H was compared with the 1995 translated version to note whether it had been changed. When the reviewer was not familiar with the language of these items, the NRC was asked about any apparent changes.

NRCs were given a list of any deviations identified by the International Study Center that went beyond those recorded in the translation deviation forms and translation verification forms. NRCs used these comments to correct errors prior to printing. Deviations that were not corrected before the final printing of the test booklets were noted in the database and used when reviewing the item data after the data collection.

5.3.6 Quality Control Monitor Item Review

As part of an ambitious quality control program, Quality Control Monitors (QCMs) were hired to document the quality of the TIMSS 1999 assessment in each country (see Chapter 8 for a description of the work of the Quality Control Monitors). An important task for the QCMs was to review the translation of the test items. QCMs reviewed the translation verification reports for each test language, verified whether the suggested changes were made in the final document, and noted these changes on a copy of the translation verification report.

5.4 Summary

The rigorous procedures for translation, cultural adaptations, translation verification, and review of the instruments put in place for TIMSS 1999 provided for comparable translations across participating countries. The verification process of internal statistical review, external translation verification by bilingual judges, and review by the International Study Center and Quality Control Monitors proved to be a comprehensive program for verifying and documenting deviations. The thorough documentation allowed for an informative review of anomalies, further ensuring accuracy in the analysis and reporting of the main survey data.

References

TIMSS (1998a). *Survey Operations Manual* (Doc. Ref. No. 98-0026). Prepared by the International Study Center at Boston College. Chestnut Hill, MA: Boston College.

TIMSS (1998b). *Guidelines for the Translation Verification of the TIMSS-R Main Survey Instruments* (Doc. Ref. No. 98-0042). Prepared by the International Study Center at Boston College. Chestnut Hill, MA: Boston College.